

## MEMORANDUM

TO: Mr. Addison Rice  
Anderson, Mulholland and Associates

DATE: July 2, 2015

FROM: R. Infante *RM*

FILE: 1503058BR1

RE: Data Validation  
Air samples  
SDG: 1503058BR1

*checked by IT  
7/14/15*

### SUMMARY

Full validation was performed on the data for several gas samples analyzed for selected volatile organic compounds by method Compendium Method TO-15: Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999. The samples were collected at the Bristol Myer Squib-Building 6 VI facility, Humacao, PR site on March 02, 2015 and submitted to Eurofins Air Toxics, Inc. of Folsom, California that analyzed and reported the results under delivery groups (SDG) 1503058BR1.

The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: Compendium Method TO-15. Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999; Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #4. October, 2006. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted. In general the data is valid as reported and may be used for decision making purposes.

The data results are acceptable for use. The following results were qualified as estimated (J): Freon-11, 2-Propanol, Carbon disulfide, 2-butanone, Tetrachloroethane, 1,2,4-Trmethylbenzene and Naphthalene in samples 1503058BR1-06A/1503058BR1-07A due to the % RSD outside laboratory/method control limit for laboratory duplicates.

### SAMPLES

The samples included in the review are listed below

Client Sample ID	Lab. Sample ID	Collected Date	Matrix	Analysis
B6-1SS	1503058BR1-05A	03/02/2015	Air	VOCs
B6-2SS	1503058BR1-06A	03/02/2015	Air	VOCs
B6-2SSDup	1503058BR1-04A	03/02/2015	Air	VOCs

## REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method

- Agreement of analysis conducted with chain of custody (COC) form
- Holding time and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/trip blanks/field blank
- Canister cleaning certification criteria
- Surrogate spike recovery
- Internal standard performance and retention times
- Field duplicate results
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results
- Quantitation limits and sample results

## DISCUSSION

### Agreement of Analysis Conducted with COC Request

Sample reports corresponded to the analytical request designated on the chain-of-custody form.

### Holding Times and Sample Preservation

Sample preservation was acceptable.

Samples analyzed within method recommended holding time.

### GC/MS Tunes

The frequency and abundance of bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within the tuning criteria associated with the method.

### Initial and Continuing Calibrations

#### VOCs (Method TO-15)

The percent relative standard deviations (%RSDs) and response factors (RFs) of all target analytes were within the QC acceptance criteria in the initial calibration. Correlation coefficients ( $r^2$ ) of target analytes were within the QC acceptance criteria. Ongoing accuracy of the instrument was determined by the analysis of a continuing calibration standard.

### Method Blank/Trip Blank/Field Blank

Target analytes were not detected in laboratory method blanks except for the followings:

DATE ANALYZED	LAB ID	LEVEL/MATRIX	COMPOUND	CONCENTRATION/UNIT
03/05/15	1503058BR1-08A	Air/low	Bromomethane	0.34 ppbv
		Air/low	m,p-xylene	0.058 ppbv
		Air/low	Cumene	0.078 ppbv
		Air/low	Propylbenzene	0.14 ppbv
		Air/low	4-Ethyltoluene	0.085 ppbv
		Air/low	1,3,5-Trimethylbenzene	0.26 ppbv
		Air/low	1,2,4-Trimethylbenzene	0.22 ppbv

No action taken analytes not detected in the samples above reporting limits except for acetone. Acetone concentration in blank < 5x the concentration found in samples.

Summa canister met cleaning certification criteria.

No trip/field blank analyzed with this data package.

### Surrogate Spike Recovery

The surrogate recoveries were within the laboratory QC acceptance limits in all samples analyzed.

### Internal Standard Performance

#### VOCs and Methanol (TO-15)

Samples were spiked with the method specified internal standard. Internal standard are performance and retention times met the QC acceptance criteria in all sample analyses and calibration standards.

### Laboratory/Field Duplicate Results

Field/laboratory duplicates were analyzed as part of this data set. Target analytes meet the RPD performance criteria of + 25 % for analytes 5 x SQL except for the followings:

Laboratory duplicates:

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
1,2,4-Trichlorobenzene		150	101	39	No action, professional judgment. QC sample.
Hexachlorobutadiene		149	101	38	
Naphthalene		123	84	38	

Field duplicates:

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
Freon 11		0.52	ND	NR	Qualify results (J) in sample and duplicate
2-Propanol		210	660	103 %	Qualify results (J) in sample and duplicate

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
Carbon Disulfide		2.1	ND	NR	Qualify results (I) in sample and duplicate
2-Butanone		91	70	26 %	Qualify results (I) in sample and duplicate
Tetrachloroethene		1.3	0.32	121 %	Qualify results (I) in sample and duplicate
1,2,4-Trimethylbenzene		17	12	35 %	Qualify results (I) in sample and duplicate
Naphthalene		27	19	35 %	Qualify results (I) in sample and duplicate

### LCS/LCSD Results

#### VOCs

LCS/LCSD (blank spike) associated with this data package were analyzed by the laboratory. Recoveries and RPD within laboratory control limits except for the following:

LCS ID	COMPOUND	% R	RPD	QC LIMIT
1503058BR1-10A	1,2,4-Trichlorobenzene	150 %	39	70 - 130/25
	Hexachlorobutadiene	149 %	38	70 - 130/25

No action taken, professional judgment.

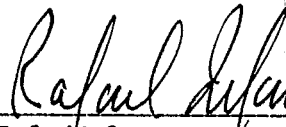
### Quantitation Limits and Sample Results

Dilutions were performed on TO-15 samples (see worksheet).

Calculations were spot checked.

### Certification

The following samples 1503058BR1-05A; 1503058BR1-06A; and 1503058BR1-07A were analyzed following standard procedures accepted by regulatory agencies. The quality control requirements met the methods criteria except in the occasions described in this document. The results are valid. Some of the results were qualified.

  
 Rafael Infante  
 Chemist License 1888





## Air Toxics

Client Sample ID: B6-1SS

Lab ID#: 1503058BR1-05A

## EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	j030523r1	Date of Collection:	3/2/15 4:35:00 PM
Dil. Factor:	6.72	Date of Analysis:	3/6/15 12:05 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	3.4	Not Detected	17	Not Detected
Freon 114	3.4	Not Detected	23	Not Detected
Chloromethane	34	Not Detected	69	Not Detected
Vinyl Chloride	3.4	Not Detected	8.6	Not Detected
1,3-Butadiene	3.4	Not Detected	7.4	Not Detected
Bromomethane	34	Not Detected	130	Not Detected
Chloroethane	13	Not Detected	35	Not Detected
Freon 11	3.4	1.4 J	19	7.8 J
Ethanol	13	18	25	35
Freon 113	3.4	Not Detected	26	Not Detected
1,1-Dichloroethene	3.4	Not Detected	13	Not Detected
Acetone	34	140	80	330
2-Propanol	13	970	33	2400
Carbon Disulfide	13	2.5 J	42	7.9 J
3-Chloropropene	13	Not Detected	42	Not Detected
Methylene Chloride	34	Not Detected	120	Not Detected
Methyl tert-butyl ether	3.4	Not Detected	12	Not Detected
trans-1,2-Dichloroethene	3.4	Not Detected	13	Not Detected
Hexane	3.4	1.9 J	12	6.7 J
1,1-Dichloroethane	3.4	Not Detected	14	Not Detected
2-Butanone (Methyl Ethyl Ketone)	13	Not Detected	40	Not Detected
cis-1,2-Dichloroethene	3.4	Not Detected	13	Not Detected
Tetrahydrofuran	3.4	Not Detected	9.9	Not Detected
Chloroform	3.4	3.6	16	18
1,1,1-Trichloroethane	3.4	Not Detected	18	Not Detected
Cyclohexane	3.4	0.54 J	12	1.9 J
Carbon Tetrachloride	3.4	Not Detected	21	Not Detected
2,2,4-Trimethylpentane	3.4	Not Detected	16	Not Detected
Benzene	3.4	1.2 J	11	3.9 J
1,2-Dichloroethane	3.4	Not Detected	14	Not Detected
Heptane	3.4	Not Detected	14	Not Detected
Trichloroethene	3.4	Not Detected	18	Not Detected
1,2-Dichloropropane	3.4	Not Detected	16	Not Detected
1,4-Dioxane	13	Not Detected	48	Not Detected
Bromodichloromethane	3.4	Not Detected	22	Not Detected
cis-1,3-Dichloropropene	3.4	Not Detected	15	Not Detected
4-Methyl-2-pentanone	3.4	1.3 J	14	5.4 J
Toluene	3.4	2.8 J	13	11 J
trans-1,3-Dichloropropene	3.4	Not Detected	15	Not Detected
1,1,2-Trichloroethane	3.4	Not Detected	18	Not Detected
Tetrachloroethene	3.4	0.85 J	23	5.7 J
2-Hexanone	13	Not Detected	55	Not Detected





# Air Toxics

Client Sample ID: B6-1SS

Lab ID#: 1503058BR1-05A

## EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	j030523r1	Date of Collection:	3/2/15 4:35:00 PM
Dil. Factor:	6.72	Date of Analysis:	3/6/15 12:05 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	3.4	Not Detected	29	Not Detected
1,2-Dibromoethane (EDB)	3.4	Not Detected	26	Not Detected
Chlorobenzene	3.4	Not Detected	15	Not Detected
Ethyl Benzene	3.4	0.74 J	14	3.2 J
m,p-Xylene	3.4	2.5 J	14	11 J
o-Xylene	3.4	7.2	14	31
Styrene	3.4	0.43 J	14	1.8 J
Bromoform	3.4	0.87 J	35	9.0 J
Cumene	3.4	Not Detected	16	Not Detected
1,1,2,2-Tetrachloroethane	3.4	Not Detected	23	Not Detected
Propylbenzene	3.4	Not Detected	16	Not Detected
4-Ethyltoluene	3.4	2.4 J	16	12 J
1,3,5-Trimethylbenzene	3.4	0.98 J	16	4.8 J
1,2,4-Trimethylbenzene	3.4	2.0 J	16	10 J
1,3-Dichlorobenzene	3.4	Not Detected	20	Not Detected
1,4-Dichlorobenzene	3.4	Not Detected	20	Not Detected
alpha-Chlorotoluene	3.4	Not Detected	17	Not Detected
1,2-Dichlorobenzene	3.4	Not Detected	20	Not Detected
1,2,4-Trichlorobenzene	13	Not Detected	100	Not Detected
Hexachlorobutadiene	13	Not Detected	140	Not Detected
Naphthalene	6.7	0.49 J	35	2.6 J

J = Estimated value.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	100	70-130





## Air Toxics

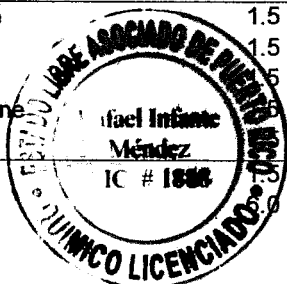
Client Sample ID: B6-2SS

Lab ID#: 1503058BR1-06A

## EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	j030521r1	Date of Collection:	3/2/15 3:08:00 PM
Dil. Factor:	2.99	Date of Analysis:	3/5/15 11:12 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.5	0.48 J	7.4	2.4 J
Freon 114	1.5	Not Detected	10	Not Detected
Chloromethane	15	Not Detected	31	Not Detected
Vinyl Chloride	1.5	Not Detected	3.8	Not Detected
1,3-Butadiene	1.5	Not Detected	3.3	Not Detected
Bromomethane	15	Not Detected	58	Not Detected
Chloroethane	6.0	Not Detected	16	Not Detected
Freon 11	1.5	0.52 J	8.4	2.9 J
Ethanol	6.0	14	11	27
Freon 113	1.5	Not Detected	11	Not Detected
1,1-Dichloroethene	1.5	Not Detected	5.9	Not Detected
Acetone	15	160	36	390
2-Propanol	6.0	210 J	15	530
Carbon Disulfide	6.0	2.1 J	19	6.6 J
3-Chloropropene	6.0	Not Detected	19	Not Detected
Methylene Chloride	15	Not Detected	52	Not Detected
Methyl tert-butyl ether	1.5	Not Detected	5.4	Not Detected
trans-1,2-Dichloroethene	1.5	Not Detected	5.9	Not Detected
Hexane	1.5	Not Detected	5.3	Not Detected
1,1-Dichloroethane	1.5	Not Detected	6.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.0	91	18	270
cis-1,2-Dichloroethene	1.5	Not Detected	5.9	Not Detected
Tetrahydrofuran	1.5	18	4.4	53
Chloroform	1.5	2.8	7.3	14
1,1,1-Trichloroethane	1.5	Not Detected	8.2	Not Detected
Cyclohexane	1.5	0.34 J	5.1	1.2 J
Carbon Tetrachloride	1.5	Not Detected	9.4	Not Detected
2,2,4-Trimethylpentane	1.5	0.36 J	7.0	1.7 J
Benzene	1.5	0.32 J	4.8	1.0 J
1,2-Dichloroethane	1.5	Not Detected	6.0	Not Detected
Heptane	1.5	Not Detected	6.1	Not Detected
Trichloroethene	1.5	Not Detected	8.0	Not Detected
1,2-Dichloropropane	1.5	Not Detected	6.9	Not Detected
1,4-Dioxane	6.0	Not Detected	22	Not Detected
Bromodichloromethane	1.5	Not Detected	10	Not Detected
cis-1,3-Dichloropropene	1.5	Not Detected	6.8	Not Detected
4-Methyl-2-pentanone	1.5	3.3	6.1	14
Toluene	1.5	1.8	5.6	7.0
trans-1,3-Dichloropropene	1.5	Not Detected	6.8	Not Detected
1,1,2-Trichloroethane	1.5	Not Detected	8.2	Not Detected
Tetrachloroethene	1.5	1.3 J	10	8.8 J
2-Hexanone	1.5	Not Detected	24	Not Detected





## Air Toxics

Client Sample ID: B6-2SS

Lab ID#: 1503058BR1-06A

### EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	j030521r1	Date of Collection:	3/2/15 3:08:00 PM
Dil. Factor:	2.99	Date of Analysis:	3/5/15 11:12 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.5	Not Detected	13	Not Detected
1,2-Dibromoethane (EDB)	1.5	Not Detected	11	Not Detected
Chlorobenzene	1.5	Not Detected	6.9	Not Detected
Ethyl Benzene	1.5	130	6.5	560
m,p-Xylene	1.5	410	6.5	1800
o-Xylene	1.5	86	6.5	370
Styrene	1.5	Not Detected	6.4	Not Detected
Bromoform	1.5	Not Detected	15	Not Detected
Cumene	1.5	1.0 J	7.3	4.9 J
1,1,2,2-Tetrachloroethane	1.5	Not Detected	10	Not Detected
Propylbenzene	1.5	0.87 J	7.3	4.3 J
4-Ethyltoluene	1.5	4.4	7.3	22
1,3,5-Trimethylbenzene	1.5	1.7	7.3	8.5
1,2,4-Trimethylbenzene	1.5	17 J	7.3	82
1,3-Dichlorobenzene	1.5	Not Detected	9.0	Not Detected
1,4-Dichlorobenzene	1.5	Not Detected	9.0	Not Detected
alpha-Chlorotoluene	1.5	Not Detected	7.7	Not Detected
1,2-Dichlorobenzene	1.5	Not Detected	9.0	Not Detected
1,2,4-Trichlorobenzene	6.0	Not Detected	44	Not Detected
Hexachlorobutadiene	6.0	Not Detected	64	Not Detected
Naphthalene	3.0	27 J	16	140

J = Estimated value.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	97	70-130







## Air Toxics

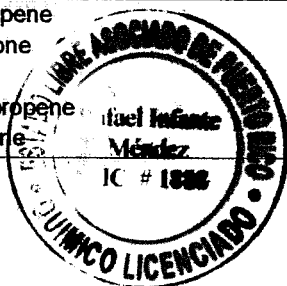
Client Sample ID: B6-2SSDup

Lab ID#: 1503058BR1-07A

## EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	j030522r1	Date of Collection:	3/2/15 3:08:00 PM
Dil. Factor:	4.87	Date of Analysis:	3/5/15 11:39 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	2.4	Not Detected	12	Not Detected
Freon 114	2.4	Not Detected	17	Not Detected
Chloromethane	24	Not Detected	50	Not Detected
Vinyl Chloride	2.4	Not Detected	6.2	Not Detected
1,3-Butadiene	2.4	Not Detected	5.4	Not Detected
Bromomethane	24	Not Detected	94	Not Detected
Chloroethane	9.7	Not Detected	26	Not Detected
Freon 11	2.4	Not Detected J	14	Not Detected
Ethanol	9.7	20	18	37
Freon 113	2.4	Not Detected	19	Not Detected
1,1-Dichloroethene	2.4	Not Detected	9.6	Not Detected
Acetone	24	140	58	320
2-Propanol	9.7	660 J	24	1600
Carbon Disulfide	9.7	Not Detected J	30	Not Detected
3-Chloropropene	9.7	Not Detected	30	Not Detected
Methylene Chloride	24	Not Detected	84	Not Detected
Methyl tert-butyl ether	2.4	Not Detected	8.8	Not Detected
trans-1,2-Dichloroethene	2.4	Not Detected	9.6	Not Detected
Hexane	2.4	Not Detected	8.6	Not Detected
1,1-Dichloroethane	2.4	Not Detected	9.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	9.7	70	29	210
cis-1,2-Dichloroethene	2.4	Not Detected	9.6	Not Detected
Tetrahydrofuran	2.4	14	7.2	40
Chloroform	2.4	2.2 J	12	11 J
1,1,1-Trichloroethane	2.4	Not Detected	13	Not Detected
Cyclohexane	2.4	Not Detected	8.4	Not Detected
Carbon Tetrachloride	2.4	Not Detected	15	Not Detected
2,2,4-Trimethylpentane	2.4	0.39 J	11	1.8 J
Benzene	2.4	Not Detected	7.8	Not Detected
1,2-Dichloroethane	2.4	Not Detected	9.8	Not Detected
Heptane	2.4	Not Detected	10	Not Detected
Trichloroethene	2.4	Not Detected	13	Not Detected
1,2-Dichloropropane	2.4	Not Detected	11	Not Detected
1,4-Dioxane	9.7	Not Detected	35	Not Detected
Bromodichloromethane	2.4	Not Detected	16	Not Detected
cis-1,3-Dichloropropene	2.4	Not Detected	11	Not Detected
4-Methyl-2-pentanone	2.4	2.8	10	12
Toluene	2.4	1.7 J	9.2	6.4 J
trans-1,3-Dichloropropene	2.4	Not Detected	11	Not Detected
1,1,2-Trichloroethane	2.4	Not Detected	13	Not Detected
Tetrachloroethene	2.4	0.32 J J	16	2.2 J
2-Hexanone	9.7	Not Detected	40	Not Detected





# Air Toxics

Client Sample ID: B6-2SSDup

Lab ID#: 1503058BR1-07A

## EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	j030522r1	Date of Collection:	3/2/15 3:08:00 PM
Dil. Factor:	4.87	Date of Analysis:	3/5/15 11:39 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	2.4	Not Detected	21	Not Detected
1,2-Dibromoethane (EDB)	2.4	Not Detected	19	Not Detected
Chlorobenzene	2.4	Not Detected	11	Not Detected
Ethyl Benzene	2.4	100	10	450
m,p-Xylene	2.4	320	10	1400
o-Xylene	2.4	68	10	300
Styrene	2.4	Not Detected	10	Not Detected
Bromoform	2.4	Not Detected	25	Not Detected
Cumene	2.4	0.81 J	12	4.0 J
1,1,2,2-Tetrachloroethane	2.4	Not Detected	17	Not Detected
Propylbenzene	2.4	0.71 J	12	3.5 J
4-Ethyltoluene	2.4	3.5	12	17
1,3,5-Trimethylbenzene	2.4	1.5 J	12	7.4 J
1,2,4-Trimethylbenzene	2.4	12 J	12	58
1,3-Dichlorobenzene	2.4	Not Detected	15	Not Detected
1,4-Dichlorobenzene	2.4	Not Detected	15	Not Detected
alpha-Chlorotoluene	2.4	Not Detected	13	Not Detected
1,2-Dichlorobenzene	2.4	Not Detected	15	Not Detected
1,2,4-Trichlorobenzene	9.7	Not Detected	72	Not Detected
Hexachlorobutadiene	9.7	Not Detected	100	Not Detected
Naphthalene	4.9	19 J	26	100

J = Estimated value.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	101	70-130





Air Toxics

## Sample Transportation Notice

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 487-4922

180 BLUE RAVINE ROAD, SUITE B  
FOLSOM, CA 95630-4719  
(916) 985-1000 FAX (916) 985-1020

Page 1 of 1

Project Manager Terry Taylor  
Collected by: (Print and Sign) Terry Taylor  
Company AMAT Email \_\_\_\_\_  
Address 2700 Westchester Ave City Rochester State NY Zip 14627  
Phone 914-394-2511 Fax 914-394-2511

## Project Info:

P.O. # \_\_\_\_\_

Project # \_\_\_\_\_

Project Name \_\_\_\_\_

## Turn Around Time:

☐ Normal☒ Rush3 day  
specify

Lab Use Only

Pressurized by:

Date: \_\_\_\_\_

Pressurization Gas:

N<sub>2</sub> He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum			
						Initial	Final	Receipt	Final (psi)
	B6-AA-2	34188	3/2/15	0938	see below	30"	0"		
	B6-1IA	94305	3/2/15	1205		30"	5"		
	B6-2IA	34011	3/2/15	1208		30"	6"		
	B6-2IADup	35132	3/2/15	1208		30"	6"		
05A	B6-1SS	36415	3/2/15	1635		30"	5"		
00A	B6-2SS	33398	3/2/15	1508		30"	4"		
07A	B6-2SSDup	12379	3/2/15	1508	↓	30"	6"		
	B6-AA-3	35142	3/3/15	0945	Hold For Analysis	30"	5"		

Relinquished by: (signature) [Signature] Date/Time 3/3/15:1100

Received by: (signature) [Signature] Date/Time 3/4/15 1200

Relinquished by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

Received by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

Relinquished by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

Received by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

## Notes:

Analyte for: Acetone, Benzene, Ethylbenzene, Isopropyl Alcohol, Methanol, MIBK, Toluene, Xylene, and Methanol. Report to MCH

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx	773032321463	NA	Good	Yes No None	1503058

# DATA REVIEW WORKSHEETS

Project Number: 1503058BR1

Date: 03/02/2015

## REVIEW OF VOLATILE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: QC criteria from "Compendium Method TO-15. Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999"; USEPA Hazardous Waste Support Branch. Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #4. October, 2006). The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) Eurofins - Air Toxics data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: 1503058BR1

Sample matrix: Air

No. of Samples: 3

Trip blank No.: -

Field blank No.: -

Equipment blank No.: -

Field duplicate No.: B6-2SS/B6-2SSDup

☒ Data Completeness

☒ Laboratory Control Spikes

☒ Holding Times

☒ Field Duplicates

☒ GC/MS Tuning

☒ Calibrations

☒ Internal Standard Performance

☒ Compound Identifications

☒ Blanks

☒ Compound Quantitation

☒ Surrogate Recoveries

☒ Quantitation Limits

☐ N/A Matrix Spike/Matrix Spike Duplicate

Overall Comments: VOCs by method TO-15

### Definition of Qualifiers:

J- Estimated results

U- Compound not detected

R- Rejected data

UJ- Estimated nondetect

Reviewer: Rafael Defaut

Date: 07/02/2015

## DATA REVIEW WORKSHEETS

## DATA COMPLETENESS

### MISSING INFORMATION

DATE LAB. CONTACTED

DATE RECEIVED

[illegible]

## DATA REVIEW WORKSHEETS

All criteria were met   X    
Criteria were not met  
and/or see below       

### HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE ANALYZED	pH	ACTION
All samples analyzed within the recommended method holding time				

### Criteria

Aqueous samples – 14 days from sample collection for preserved samples ( $\text{pH} \leq 2$ ,  $4^{\circ}\text{C}$ ), no air bubbles.

Aqueous samples – 7 days from sample collection for unpreserved samples,  $4^{\circ}\text{C}$ , no air bubbles.

Soil samples- 7 days from sample collection.

Cooler temperature (Criteria:  $4 \pm 2^{\circ}\text{C}$ ): N/A – summa canisters

### Actions

If the VOCs vial(s) have air bubbles, estimate positive results (J) and reject nondetects (R).

If the % solids of soil samples is 10-50%, estimate positive results (J) and nondetects (UJ)

If the % solid of soil samples is  $< 10\%$ , estimate positive results (J) and reject nondetects (R).

If holding times are exceeded but  $< 14$  days beyond criteria, estimate positive results (J) and nondetects (UJ).

If holding times are exceeded but  $< 28$  days beyond criteria, estimate positive results (J) and reject nondetects (R).

If holding times are grossly exceeded ( $> 28$  days beyond criteria), reject all results (R).

If samples were not iced or if the ice were melted ( $> 10^{\circ}\text{C}$ ), estimate positive results (J) and nondetects (UJ).

## DATA REVIEW WORKSHEETS

All criteria were met X  
Criteria were not met see below \_\_\_\_\_

## GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

X The BFB performance results were reviewed and found to be within the specified criteria.

  X   BFB tuning was performed for every 24 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

List the samples affected:

**If mass calibration is in error, all associated data are rejected.**

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below \_\_\_\_\_

### CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:   03/04/15  

Dates of continuing calibration:   03/05/15  

Instrument ID numbers:   MSD-J  

Matrix/Level:   Air/low  

DATE	LAB ID#	FILE	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and continuing calibration met the method performance criteria.					

#### Criteria

All RFs must be  $> 0.05$  regardless of method requirements for SPCC.

All %RSD must be  $\leq 15\%$  regardless of method requirements for CCC.

All %Ds must be  $\leq 30\%$  regardless of method requirements for CCC.

Method TO-15 does not specify criterion for the curve correlation coefficient (r). A limit for r of  $\geq 0.995$  has therefore been utilized as professional judgment.

#### Actions

If any compound has an initial RF or a continuing RF of  $< 0.05$ , estimate positive results (J) and reject nondetects (R), regardless of method requirements.

If any compound has a %RSD  $> 15\%$ , estimate positive results (J) and use professional judgment to qualify nondetects.

If any compound has a %RSD  $> 90\%$ , estimate positive results (J) and reject nondetects (R).

If any compound has a % D  $> 30\%$ , estimate positive results (J) and reject nondetects (R).

If any compound has a % D  $> 30\%$ , estimate positive results (J) and nondetects (UJ).

If any compound has a % D  $> 90\%$ , estimate positive results (J) and reject nondetects (R).

If any compound has  $r < 0.995$ , estimate positive results and nondetects.

A separate worksheet should be filled for each initial curve



# DATA REVIEW WORKSHEETS

All criteria were met \_\_\_\_\_  
 Criteria were not met \_\_\_\_\_  
 and/or see below   X  

## V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

### Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/MATRIX	COMPOUND	CONCENTRATION/UNITS
---------------	--------	--------------	----------	---------------------

  All method blank meeth method specific criteria except for the followings:  

<u>03/05/15</u>	<u>1503058BR1-08A</u>	<u>Air/low</u>	<u>Bromomethane</u>	<u>0.34 ppbv</u>
		<u>Air/low</u>	<u>m,p-xylene</u>	<u>0.058 ppbv</u>
		<u>Air/low</u>	<u>Cumene</u>	<u>0.078 ppbv</u>
		<u>Air/low</u>	<u>Propylbenzene</u>	<u>0.14 ppbv</u>
		<u>Air/low</u>	<u>4-Ethyltoluene</u>	<u>0.085 ppbv</u>
		<u>Air/low</u>	<u>1,3,5-Trimethylbenzene</u>	<u>0.26 ppbv</u>
		<u>Air/low</u>	<u>1,2,4-Trimethylbenzene</u>	<u>0.22 ppbv</u>

  Summa canisters met cleaning certification criteria (data in SDG: 150305AR1)  

### Field/Equipment/Trip blank

DATE ANALYZED	LAB ID	LEVEL/MATRIX	COMPOUND	CONCENTRATION UNITS
---------------	--------	--------------	----------	---------------------

  No field/trip/equipment blanks analyzed with this data package.  


# DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below       

## V B. BLANK ANALYSIS RESULTS (Section 3)

### Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

ALs = 10x the amount of common contaminants (methylene chloride, acetone, 2-butanone, and toluene)

ALs = 5x for any other compounds

Specific actions are as follows:

If the concentration is < sample quantitation limit (SQL) and  $\leq$  AL, report the compound as not detected (U) at the SQL.

If the concentration is  $\geq$  SQL but  $\leq$  AL, report the compound as not detected (U) at the reported concentration.

If the concentration is  $\geq$  SQL and  $>$  AL, report the concentration unqualified.

Notes:

High and low level blanks must be treated separately

Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

## DATA REVIEW WORKSHEETS

All criteria were met ☒  
 Criteria were not met  
 and/or see below \_\_\_\_\_

### SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.

Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND			ACTION
	1,2-DICHLOROETHANE- d4	Toluene- d8	4-BFB	

\_\_\_\_ Surrogate recoveries within laboratory control limits \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

QC Limits\* (Air)

\_\_\_\_ LL to UL \_\_\_\_ 70 to 130 \_\_\_\_      \_\_\_\_ 70 to 130 \_\_\_\_ 70 to 130 \_\_\_\_

- \* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- \* If QC limits are not available, use limits of 80 – 120 % for aqueous and 70 – 130 % for solid samples.

Actions:

QUALITY	%R < 10%	%R = 10% - LL	%R > UL
Positive results	J	J	J
Nondetects results	R	UJ	Accept

Surrogate action should be applied:

If one or more surrogate in the VOC fraction is out of specification, but has a recovery of > 10%.

If any one surrogate in a fraction shows < 10 % recovery.

## DATA REVIEW WORKSHEETS

All criteria were met \_\_\_\_\_  
 Criteria were not met \_\_\_\_\_  
 and/or see below \_\_\_N/A\_\_\_

### VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

#### 1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

List the %Rs, RPD of the compounds which do not meet the criteria.

Sample ID: \_\_\_\_\_ Matrix/Level: \_\_\_\_\_

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
_____ MS/MSD are not required as part of Method TO-15; blank spike used to assess _____ accuracy _____					

- \* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- \* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).

If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).

If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

## VII. B MATRIX SPIKE/MATRIX SPIKE DUPLICATE

### MS/MSD – Unspiked Compounds

If all target analytes were spiked in the MS/MSD, this review element is not applicable.

List the %RSD of the compounds which do not meet the criteria.

Sample ID: \_\_\_\_\_ Matrix/Level/Unit: \_\_\_\_\_

**Actions:**

- 10

# DATA REVIEW WORKSHEETS

All criteria were met \_\_\_\_\_  
 Criteria were not met \_\_\_\_\_  
 and/or see below X

## VIII. LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

### 1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD?  
 Yes or No. If no make note in data review memo.

List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	RPD	QC LIMIT
LCS/LCSD % recoveries and RPD within laboratory control limits except for the followings:				
1503058BR1-10A	1,2,4-Trichlorobenzene	150 %	39	70 - 130/25
	Hexachlorobutadiene	149 %	38	70 - 130/25

- \* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- \* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).

If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

### 2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? Yes or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below \_\_\_\_\_

### IX. LABORATORY DUPLICATE PRECISION

Sample IDs:   LCS/LCSD  

Matrix:   Air  

Laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

Suggested criteria: RPD  $\pm$  25% for air samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
RPD within laboratory and generally acceptable control limits except for the following:					
1,2,4-Trichlorobenzene		150	101	39	No action, professional judgment. QC sample.
Hexachlorobutadiene		149	101	38	
Naphthalene		123	84	38	

#### Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

# DATA REVIEW WORKSHEETS

All criteria were met \_\_\_\_\_  
 Criteria were not met \_\_\_\_\_  
 and/or see below \_\_\_\_\_X\_\_\_\_\_

## IX. FIELD DUPLICATE PRECISION

Sample IDs: B6-2SS/B6-2SSDup

Matrix: Air

Field duplicate samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

Suggested criteria: RPD  $\pm$  25% for air samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
Freon 11		0.52	ND	NR	Qualify results (J) in sample and duplicate
2-Propanol		210	660	103 %	Qualify results (J) in sample and duplicate
Carbon Disulfide		2.1	ND	NR	Qualify results (J) in sample and duplicate
2-Butanone		91	70	26 %	Qualify results (J) in sample and duplicate
Tetrachloroethene		1.3	0.32	121 %	Qualify results (J) in sample and duplicate
1,2,4-Trimethylbenzene		17	12	35 %	Qualify results (J) in sample and duplicate
Naphthalene		27	19	35 %	Qualify results (J) in sample and duplicate

### Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.



## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below       

### X. INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

List the internal standard area of samples which do not meet the criteria.

- \* Area of +40% or -40% of the IS area in the associated calibration standard.
- \* Retention time (RT) within  $\pm 0.06$  seconds of the IS area in the associated calibration standard.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION
------	-----------	--------	---------	------------------	--------

Internal standard area and retention times within laboratory control limits for both samples and calibration standards


Actions:

1. IS actions should be applied to the compound quantitated with the out-of-control ISs

QUALITY	IS AREA < -40%		IS AREA > + 40%
Positive results	J		J
Nondetected results	R		ACCEPT

2. If a IS retention time varies more than 0.330 seconds, the chromatographic profile for that sample must be examined to determine if any false positive or negative exists. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for the sample fraction.

## DATA REVIEW WORKSHEETS

All criteria were met   X    
Criteria were not met  
and/or see below       

### XII. SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

1503058BR1-05A

Chloroform      RF = 2.48216

$$[ ] = (6281)(25.0)/(117187)(2.48216)$$

$$= 0.53983 \text{ ppbv OK}$$

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below       

### XII. QUANTITATION LIMITS

#### A. Dilution performed

SAMPLE ID	DILUTION FACTOR	REASONS FOR DILUTION
1503058BR1-05A	6.72	Dilution was performed on all samples due to the presence of high level target species.
1503058BR1-06A	2.99	
1503058BR1-07A	4.87	

#### B. Percent Solids

List samples which have  $\leq 50$  % solids


#### Actions:

If the % solids of a soil sample is 10-50%, estimate positive results (J) and nondetects (UJ)

If the % solids of a soil sample is < 10%, estimate positive results (J) and reject nondetects (R)